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CDC HEALTH UPDATE

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CDC Guidelines for State Health Departments

The attached document below contains CDC Guidelines for State Health Departments:

1. Responding to "Anthrax Threats" and Anthrax (*B. anthracis*) Diagnostic Testing

2. Anthrax Information for Laboratory Personnel

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CDC Guidelines for State Health Departments

I. Responding to Anthrax Threats and Anthrax (*B. anthracis*) Diagnostic Testing

Anthrax Threats (Letters, packages, etc.)

Dealing with a suspicious package

- Do not open the letter.
- If the letter has already been opened and **powder spills out, do not clean it up. Keep others away from the area.**
- Double bag the letter; plastic is best (use plastic/rubber gloves and a particulate mask if available).
- Immediately wash your hands with soap and water.
- Notify your supervisor, law enforcement officials, and the FBI
- Notify local, county, and state health officials
- Evacuate the area
- Ensure that all persons who have handled the letter wash their hands
- Start a list of names and telephone numbers all persons who have handled the letter

- Give potentially exposed persons information about the signs and symptoms of illness associated with the biologic agent and about whom to contact and where to go should they develop illness.
- Place all clothing items worn when in contact with the letter into plastic bags
- Keep these bags with you, so that they are available for law enforcement officials
- As soon as possible shower with soap and water

Asymptomatic patient WITHOUT known exposure

- Provide reassurance to the patient about the rarity of infection without known exposure.
- Recommend the patient see a health care provider for further concerns and/or diagnostic tests.
- It's important for people to know that there is no screening test available for the detection of anthrax infection in an asymptomatic person. Nasopharyngeal swabs and blood serum tests should not be used for diagnosis or screening. NP swabs and blood serum tests are generally used to confirm a case or as an epidemiologic tool.

Asymptomatic patient WITH known exposure

- Conduct an individual risk assessment with public health officials and refer to a health care provider if post-exposure prophylaxis is necessary. Currently, there are no screening tests available for the detection of anthrax infection in an asymptomatic person.
- In this circumstance, decontaminating the patient and their clothing is not routinely recommended.
- In Florida, susceptibility testing determined that the isolate was penicillin susceptible, and therefore amoxicillin was indicated as a first-line agent.
- Post-exposure Prophylaxis (PEP) Recommendations

	Initial therapy	Duration
Adults (including pregnant woman [1,2] and immmunocompromised)	Ciprofloxacin 500 mg po BID **Or** Doxycycline 100 mg po BID	60 days
Children [1,3]	Ciprofloxacin 15-20 mg/kg po Q12 hrs [4] **Or** Doxycycline [5]: >8 yrs and >45 kg: 100 mg po BID >8 yrs and ≤ 45 kg: 2.2 mg/kg po BID	60 days

	≤ 8 yrs: same as >8 yrs and ≤ 45 kg	

1. If susceptibility testing allows, therapy should be changed to oral amoxicillin for post-exposure prophylaxis to continue therapy out to 60 days.

2. Although tetracyclines are not recommended during pregnancy, their use may be indicated for life-threatening illness. Adverse affects on developing teeth and bones are dose related, therefore, doxycycline might be used for a short course of therapy (7-14 days) prior to the 6th month of gestation. Please consult physician after the 6th month of gestation for recommendations.

3. Use of tetracyclines and fluoroquinolones in children has adverse effects. These risks must be weighed carefully against the risk for developing life-threatening disease. If a release of *B. anthracis* is confirmed, children should be treated initially with ciprofloxacin or doxycycline as prophylaxis but therapy should be changed to oral amoxicillin 40 mg/kg of body mass per day divided every 8 hours (not to exceed 500 mg three times daily) as soon as penicillin susceptibility of the organism has been confirmed.

4. Ciprofloxacin dose should not exceed 1 gram/day in children.

5. In 1991, the American Academy of Pediatrics amended their recommendation to allow treatment of young children with tetracyclines for serious infections, such as, Rocky Mountain Spotted Fever, for which doxycycline may be indicated. Doxycycline is preferred for its twice-a-day dosing and low incidence of gastrointestinal side effects.

Hospitalized Patients with Symptoms Compatible with Anthrax

- Notify local and state public health officials so they can begin an epidemiologic investigation.
- Confirm the diagnosis by obtaining the appropriate laboratory specimens based on the clinical form of anthrax that is suspected (inhalational, gastrointestinal, or cutaneous).

- Inhalational anthrax: nasal swab, blood, CSF, and/or sputum

- Gastrointestinal anthrax: vomitus, feces, and/or blood

- Cutaneous anthrax: vesicular fluid and/or blood

Evaluation of possible anthrax infection for individuals not connected with the AMI incident in Florida should be performed through standard laboratory tests, following the Laboratory Response Network (LRN [1]) guidelines http://www.bt.cdc.gov (follow the link for Resources: Agents/Diseases □ *Bacillus anthracis*)

Laboratory criteria for confirmation of *B. anthracis* infection: rapid screening assay (PCR-based and antigen detection based) for use on cultures and directly on clinical specimens

a. Presumptive identification criteria (level A LRN laboratory)

1. From clinical samples, such as blood, CSF, or skin lesion (eschar) material: encapsulated gram-positive rods

2. From growth on sheep blood agar: large gram-positive rods

3. Nonmotile

4. Nonhemolytic on sheep blood agar

b. Confirmatory criteria for identification of *B. anthracis* (level B or C LRN laboratory)

1. Capsule production and

2. Lysis by gamma-phage or

3. Direct fluorescent antibody assay (DFA)

Signs and Symptoms of Anthrax Infection

Inhalational anthrax: A brief prodrome resembling a viral respiratory illness followed by development of hypoxia and dyspnea, with radiographic evidence of mediastinal widening. This, the most lethal, form of anthrax results from inspiration of 8,000-40,000 spores of *B. anthracis*. The incubation of inhalational anthrax among humans is unclear, but it is reported to range between 1 and 7 days possibly ranging up to 42 days. Host factors, dose of exposure and chemoprophylaxis may play a role. Initial symptoms include sore throat, mild fever, muscle aches and malaise. These may progress to respiratory failure and shock. Meningitis frequently develops. Case-fatality estimates for inhalational anthrax are based on incomplete information regarding exposed populations and infected populations in the few case series and studies that have been published. However, case-fatality is extremely high, even with all possible supportive care including appropriate antibiotics. Records of industrially acquired inhalational anthrax in the United Kingdom before antibiotics were available reveal that 97% of cases were fatal. With antibiotic treatment the fatality rate is estimated to be at least 75%. Though estimates of the impact of the delay in postexposure prophylaxis or treatment on survival can only be approximated, it has been suggested that or each day of delay postexposure in initiating prophylaxis the case-fatality rate increases by 5 to 10%.

Gastrointestinal anthrax: Severe abdominal distress followed by fever and signs of septicemia. This form of anthrax usually follows the consumption of raw or undercooked contaminated meat and is considered to have an incubation period of 1-7 days. An oropharyngeal and an abdominal form of the disease have been described in this category. Involvement of the pharynx is usually characterized by lesions at the base of the tongue, sore throat, dysphagia, fever, and regional lymphadenopathy. Lower bowel inflammation usually causes nausea, loss of appetite, vomiting and fever, followed by abdominal pain, vomiting blood and bloody diarrhea. The case-fatality is estimated to be 25-60%, and the effect of early antibiotic treatment on that case-fatality is not defined.

Cutaneous anthrax: A skin lesion evolving from a papule, through a vesicular stage, to a depressed black eschar. This is the most common naturally occurring type of infection (>95%) and usually occurs after skin contact with contaminated meat, wool, hides or leather from infected animals. Incubation period ranges from 1-12 days. Skin infection begins as a small papule, progresses to a vesicle in 1-2 days followed by a necrotic ulcer. The lesion is usually painless, but patients also may have fever, malaise, headache and regional lymphadenopathy. The case fatality for cutaneous anthrax is 20% without and 1% with antibiotic treatment.

II. Anthrax Information for Laboratory Personnel

These guidelines provide background information and guidance to clinical laboratory personnel in recognizing *Bacillus anthracis* in a clinical specimen. They are NOT intended to provide training for laboratory identification of *B. anthracis*. Clinical lab personnel will most likely be the first ones to perform preliminary testing on clinical specimens from patients who may have been intentionally exposed to the organism, and will play a critical role in facilitating rapid identification of *B. anthracis*. Laboratory confirmation of *B. anthracis* should be performed at the State Public Health Laboratory.

Any suspected isolate of *B. anthracis* must be reported to the State Public Health Laboratory IMMEDIATELY. The State Public Health Laboratory is available for consultation or testing 24 hours per day and can be reached through the DOH, Communicable Disease Epidemiology 24-hour emergency number.

HANDLING LABORATORY SPECIMENS (possible *B. anthracis)*

- Risk to lab personnel from handling clinical lab specimens with B. *anthracis* is low, but it is important to minimize possible exposures to personnel as well as prevent contamination of the lab. Standard lab practices are sufficient. If *B. anthracis* is suspected, these precautions should be followed:

  - Wear gloves and protective gowns when handling clinical specimens

  - Wash immediately with soap and water if there is direct contact with a clinical or lab specimen

  - Avoid splashing or creating aerosols

  - Perform lab tests in an annually certified Class II Biological Safety Cabinet; if that is not possible, then use standard lab protective eyewear and a mask

  - Blood cultures should be maintained in a closed system (blood culture bottles)

  - Keep culture plates covered at all times; minimize exposure when extracting specimens for testing

  - Work on a smooth surface that can be cleaned easily and wipe with bleach regularly.

- If lab or clinical specimen material is spilled or splashed onto lab personnel:

  - Remove outer clothing carefully while still in the lab and place in a labeled, plastic bag

  - Remove rest of clothing in the locker room and place in a labeled, plastic bag

  - Shower thoroughly with soap and water in the locker room

  - Inform your supervisor and physician

- If exposure to contaminated sharps occurs:

  - Follow standard reporting procedures for sharps exposures

- Thoroughly irrigate site with soap and water and apply a disinfectant solution such as a 0.5% hypochlorite solution. DO NOT SCRUB AREA.

- Promptly begin prophylaxis for cutaneous anthrax

- Recommended treatment for cutaneous exposure: prophylaxis with Ciprofloxacin 500 mg by mouth twice a day for 7-10 days or Doxycycline 100 mg by mouth twice a day for 7-10 days.

- Notify the State Department of Health (DOH), Public Health Laboratory (PHL)

ROLE OF THE CLINICAL LABORATORY

- Perform laboratory tests for presumptive identification of *B. anthracis* on clinical specimens

- Raise your index of suspicion for *B. anthracis* when the clinical picture (provided by the clinician) involves a rapidly progressive respiratory illness of unknown cause in a previously healthy person

- Refer any suspected isolates IMMEDIATELY to the DOH, PHL

PRESUMPTIVE IDENTIFCATION OF *Bacillus anthracis*

- **Direct smears from clinical specimens**

  - Encapsulated broad rods in short chains, 2-4 cells. India Ink will demonstrate capsule (Gram stain will not)

  - *B. anthracis* will not usually be present in clinical specimens until late in course of the disease

- **Smears from sheep blood agar or other routine nutrient medium**

  - Non-encapsulated broad rods in long chains

  - Encapsulated bacilli will only grow in nutrient agar supplemented with 0.8% sodium bicarbonate in the presence of 5% CO_2 (Note: this procedure is performed in Level B laboratories)

Gram stain morphology of *B. anthracis*

- Broad, gram-positive rod: 1-1.5 x 3-5 µ
- Oval, central to subterminal spores: 1 x 1.5 µ with no significant swelling of cell
- Spores usually NOT present in clinical specimens unless exposed to atmospheric O_2

Colonial Characteristics of *B. anthracis*

- Bacillus anthraciscan be isolated primarily from blood, sputum, CSF, vesicular fluid or eschar, and stool (if gastrointestinal anthrax).
- After incubation on a blood agar plate for 15-24 hours at 35-37°C, well isolated colonies are 2-5 mm in diameter; heavily inoculated areas may show growth in 6-8 hours

- Gray-white, flat or slightly convex colonies are irregularly round, with edges that slightly undulate, and have ground glass appearance
- Often have comma-shaped protrusions from colony edge (Medusa head colonies)
- Tenacious consistency (when teased with a loop, the growth will stand up like a beaten egg white)
- Non-hemolytic (weak hemolysis may be observed under areas of confluent growth in aging cultures and should NOT be confused with real β-hemolysis)
- Will not grow on MacConkey agar
- Non-motile

Presumptive Identification key for *Bacillus anthracis*

- Non-hemolytic
- Non-motile
- Encapsulated (requires India ink to visualize the capsule)
- Gram-positive, sporeforming rod

If *B. anthracis* is suspected

- The health care provider, local law enforcement, and the local and State DOH should be notified immediately
- Do not perform further tests once you have reason to suspect *B. anthracis.* The specimen should be transported to the DOH as directed (see Packaging and Transporting Protocol)
- Level B laboratories (State DOH) will perform the following presumptive and confirmatory tests:

-lysis by gamma phage

-capsule detection (by DFA)

-detection of cell-wall polysaccharide antigen by DFA

DECONTAMINATION

- Effective sporicidal decontamination solutions
- Commercially-available bleach, 0.5% hypochlorite (a **1:10** dilution of household bleach)
- Rinse off the concentrated bleach to avoid its caustic effects

Surfaces and non-sterilizable equipment

- Work surfaces should be wiped before and after use with a sporicidal decontamination solution
- Routinely clean non-sterilizable equipment with a decontamination solution

Contaminated instruments (pipettes, needles, loops, micro slides)

- Soak in a decontamination solution until autoclaving

Accidental spills of material known or suspected to be contaminated with *B. anthracis*

- For contamination involving fresh clinical samples:
- Flood with a decontamination solution
- Soak five minutes before cleaning up
- For contamination involving lab samples, such as culture plates or blood cultures, or spills occurring in areas that are below room temperature:
- Gently cover spill, then liberally apply decontamination solution
- Soak for one hour before cleaning up
- Any materials soiled during the clean-up must be autoclaved or incinerated

DISPOSAL

- Incinerate or steam sterilize cultures, infected material, and suspect material

PACKAGING and TRANSPORTING PROTOCOL

Packaging and labeling specimens is the same as for any infectious substance

- If the specimen is a dry powder or paper material, place it in a plastic zip-lock bag, and place biohazard label (see diagram)
- If the specimen is a clinical specimen, place biohazard label on the specimen receptacle, wrap the receptacle with an absorbent material (see diagram)
- Place the bag or specimen receptacle into a leak proof container with a tight cover that is labeled biohazard.
- Place this container into a second leak proof container with a tight cover that is labeled biohazard. The size of the second container should be no larger than a one-gallon paint can.
- For a clinical specimen, an ice pack (not ice) should be placed in the second container to keep the specimen cold
- If the specimen is not a clinical specimen, but is paper or powder, the ice pack should be omitted
- Place the second container into a third leak proof container with a tight cover that is labeled biohazard. The third container should be no larger than a five-gallon paint can.
- Both containers should meet state and federal regulations for transport of hazardous material, and be properly labeled.

Transporting specimens to the DOH Public Health Lab

- Will be coordinated with the DOH Public Health Lab at [state telephone number]
- Local FBI personnel may be utilized to transport specimens if bioterrorism is suspected
- In cases where the specimen is shipped by commercial carrier, ship according to State and Federal shipping regulations

Helpful Websites

- Biosafety in the Microbiology Lab www.cdc.gov/od/ohs
- Guideline for Isolation Precautions www.cdc.gov/ncidod/hip
- Public Health Image Library phil.cdc.gov
- CDC Division of Laboratory Systems (DLS) www.phppo.cdc.gov/dls/default.asp
- World Health Organization (WHO): Guidelines for the Surveillance and Control of Anthrax in Humans and Animals www.who.int/emc-documents/zoonoses/whoemczdi986c.html

REFERENCES

for Laboratory Guidelines

- Laboratory Protocols for bioterrorism response laboratories for the identification of *Bacillus anthracis*. CDC BT public web site: www.bt.cdc.gov
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The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national and international organizations.

DEPARTMENT OF HEALTH AND HUMAN SERVICES